DRAFT

Positive Train Control (PTC) Working Group
Data & Implementation Task Force Meeting November 17, 1998
Jacksonville, FL

November 17: Data & Implementation Task Force Meeting convened at 8:00 a.m.

- Ted Bundy opened the meeting by addressing the group with an apology concerning the Agenda. Ted had scheduled a full day for meetings of the various teams that are working on the Progress Report to the Congress on PTC, and this resulted in conflicts for some of the task force members. The Data & Implementation Group is meeting for a part of the day and then break up into the smaller teams. (Operating Practices Team and the ITS Team)

- Fran Hooper/APTA requested that the FRA Team Leaders meet to discuss the progress of each team, and to resolve any agenda conflicts prior to the Implementation Task Force discussion of the December meeting in New Orleans. The FRA Team members will meet at 5 p.m. today.

- Several draft documents were distributed to the group (VOLPE Report for CRAM II, DRAFT Matrix of PTC Systems, and the Importance of Railroads to National Transportation) Mr. Cothen asked that each member take a look at these documents later today and if there are any comments, please respond as soon as possible.

  Note: Since all of the documents are in draft form, they will neither be attached to the minutes nor identified with document numbers.

- Rick Inclima asked "What is the purpose of the PTC Operating Rules Team" and "What are they going to do"? Ted Bundy indicated that the team would be meeting to write Section VI, 2 & 3 of the PTC Progress Report to the Congress, and to identify the types of rules that need to be considered during implementation of PTC. Mr. Inclima recommended that any rules consider on-track equipment as well as trains; several members noted that this was already included in the outline for the Report to Congress.

The meeting adjourned at 8:50 a.m. for break-out into teams and would meet as scheduled in the morning.

November 18: Data & Implementation Task Force Meeting convened at 8:00 a.m.

- Dean Hollingsworth opened the meeting by asking the group for comments on the minutes of the October meeting. There were no comments and the group voted to accept the minutes.
- Frank Roskind reported on the Economics Team meeting of November 12-13 and gave a status report to date. Item points of his discussion, which are included in these minutes as **Attachment No. 1** are:
  - Accident Costs
  - System Costs

- Mark Jones reported on the PTC/ITS meeting of November 17. The overview section of the

report, except for possibly identifying train and highway traffic that e-mail his report to Ted Bundy for distribution to all members of the group.

- Ted Bundy reported on the PTC Operating Rules Team's first meeting on November 17. The team broke the potential PTC systems into three categories for operating rules: ***Pure Overlay, Enhanced Overlay (modifying the method of operation in various degrees), and Stand Alone.*** **If, then** statements were written for each of the three categories, then an **and** statement was added to deal with unequipped trains or failures of the system. Based on these statements, three of the team members undertook assignments of identifying the categories of operating rules that would be necessary for each of the three systems. These three individuals will e-mail their work back to Ted Bundy and Rich McCord in time for the full team report to be pulled together for distribution and discussion in New Orleans in December 1998.

  Editor's Note: We will need definitions for the three PTC system categories mentioned in this bullet.

The group took a 30 minute break.

- Ted Bundy held an open discussion on the DRAFT PTC-Glossary of Terms and Definitions. Ted indicated that this group will extract the definitions needed from this DRAFT Glossary, for the Report to Congress. Ted asked that the group start with the definition of Interoperability.

  Jim Stem reported that defining the term interoperability would be a chance to incorporate language from the different suppliers to encourage their PTC systems. Ron Lindsey commented on the third option in the glossary for definition of Interoperable (Interoperability).

  Doug Hortsmann asked for clarification of the phrase, "additional on-board equipment", would it mean that additional equipment would have to be added, so it would be more efficient but not interoperable. Jim Stem also had the same concern. A vote was taken to eliminate definition option (1) of interoperability.

  Rick Inclima made the suggestion to add to the definition "or other vehicles", after the word trains. Gary Pruitt made a suggestion to delete the term additional on-board equipment and that the wording similar systems be changed to compatible systems.

  Ron Lindsey used an example of a CSX CBTM train going onto UP property: there is no track data base on CSX's CBTM system and they have no plans to add this additional equipment, so it would be up to the UP to give the CSX this equipment to add to their locomotive if they wanted full compatibility. Ron said that there would be interoperability even without this, provided that locomotives had a standard buss and the "back office" computers used identical message sets. Gerhard Thelen suggested that we stop on the term of interoperability and that the group could spend all day on the one term. Ted Bundy stated that we have to have a definition at this time, it is needed for the Report to Congress, which is due by the next meeting.

- Jim Stem made a proposal to change the definition of Interoperability to: As applied to signal

and train control systems, including PTC, the ability which permits trains, locomotives, or other vehicles equipped with the same or compatible systems to safely operate on all connecting railroads interchangeably and automatically without hindrance or delay, with no significant change in operator interface, while maintaining at least the minimum (or core) PTC functionality requirements.

- Howard Moody made a proposal to also change the definition of Interoperability to: The capability of trains, lead locomotives or other on-track vehicles equipped with train control systems to operate safely on other railroads. Jim Stem and Ted Bundy both commented on Howard Moody's change in the definition, stating that the wording could serve to permit degradation in the method of operation.

Management asked for a 10 minute caucus which was added to the lunch. Meeting to resume at 12:45 p.m.

- Ron Lindsey reported on the caucus of Management. Management would like the definition of interoperability to read:

  PTC Interoperability - The capability of trains, lead locomotives, or other on-track vehicles equipped with train control systems to operate safely on other railroads while maintaining at least the minimum (or core) PTC functionality requirements.

- Jim Stem suggested to add the phrase, **with no significant change in operator interface**, after the word railroads . Tim DePaepe suggested to delete the phrase, **equipped with train control systems.** Rick Inclima suggested to add the words **PTC equipped** after the words, The capability of ..... Tim DePaepe had three concerns, the wording of **significant** in the above definition. Ted Bundy then asked the group to look at the Interoperability (2), which states **no significant change in performance or operator interface.**

The group requested a caucus.

- Jim Stem reported that labor has requested the following definition:

  PTC Interoperability - The ability which permits trains, locomotives, or other vehicles, equipped with the same or compatible PTC systems to safely operate on all connecting railroads interchangeably and automatically without hindrance or delay, with no significant change in performance or operator interface while maintaining at least the minimum or core PTC functionality requirements.

- Howard Moody suggested that management has requested the following definition**:**

  PTC Interoperability - The capability of PTC equipped trains, locomotives, or other on-track vehicles to operate safely on other railroads, while maintaining at least the minimum (or core) PTC functionality requirements.

The group requested another caucus for Howard Moody, Jim Stem, and Fran Hooper to work on an agreeable definition to present to the group.

- Howard Moody, Jim Stem, and Fran Hooper presented the following definition:

  PTC Interoperability - The capability of PTC equipped trains, locomotives, or other on-track vehicles to operate safely on other railroads, while maintaining at least the minimum (or core) PTC functionalities. The intent of PTC interoperability includes the elimination of interline delay and standardization of operator interfaces.

The group voted to accept the above definition.

- Fran Hooper indicated that in the glossary we have the terms of **American Short Line and Regional Railroad Association, Association of American Railroads, and Commuter Rail**. Ms. Hooper indicated that the **Commuter Rail** definition needed work. She will work on it and e-mail Ted Bundy her the rewritten definitions.

- Howard Moody asked if the DRAFT Standards Glossary was incorporated into the DRAFT PTC - Glossary of Terms and Definitions and that the term ***Performance Standards*** was missing from the full DRAFT PTC Glossary. Ted Bundy indicated that the two glossaries were combined and that we would take a look to make sure that the Standards Glossary is incorporated in it's entirety into the PTC Glossary.

- Dick Stotts reported on the DRAFT Matrix of the PTC Systems Capabilities. Merrill Travis stated that the four PTC levels, developed by the Accident Review Team, should be included in the PTC Glossary of Terms and Definitions. Mr. Stotts asked for comments or feedback on the Matrix by November 27, 1998.

- Grady Cothen distributed three documents and asked that each member take a look at these documents and report back to him individually. The documents were:

  - A letter to Robert D. Krebs, Chairman, President and CEO Burlington Northern Santa Fe Corporation, from FRA's Administrator Jolene M. Molitoris**, (Working Document WG-Nov-60). Note:** Identical letters were sent to the CEO's of each Class One railroad.
  - PTC Challenges — Train Control and Traffic Management on the General System for the Next Century
  - PTC Time Line

  Mr. Cothen also briefed the group on FRA's accountability for the Secretary's PTC Progress Report to the Congress, stating that it had to be put into the clearance process in early January.

- Ted Bundy discussed the December agenda and stated that all reports for the Report to Congress are due on December 15. The Economics Team will meet on Monday December 14 from 8 a.m. - 5 p.m. and FRA will have a meeting starting at 2 p.m. On Tuesday, December 15 the Data & Implementation Task Force will meet for reading and caucusing on the team reports. On Wednesday, December 16 the Data & Implementation Team will meet as a full group from 8 a.m. - 5 p.m.

  The January meeting of the Data & Implementation Task Force will be held in Washington,

D.C. (a place to be determined later) on January 26-27. Purpose of the meeting will be to have a final briefing on the Report to Congress, and to determine what, if any, long term assignments remained for the Data & Implementation Task Force. He asked that each task force member begin thinking about this. Ted also stated that there would **not** be a Data & Implementation Task Force meeting scheduled in February 1999.

- Bob Dorer stated that an e-mail message will go out within the next week to all members concerning the CRAM II report. Bob also said that the various PTC Implementation Task Force documents, such as the meeting minutes and draft glossary, will be on the website in numerous formats (WordPerfect, Word, Rich Text Format, etc.) The Volpe website - **http:// 204.166.190.40** with user ID of **rsac,** and password of **rsac.** ID and password are **not** case sensitive.

- Grady Cothen distributed the report responsibilities matrix for the Report to Congress. **(Attachment No. 2, as modified)**, and discussed the responsibilities of certain people and teams for various sections of the report.

Editor's Note: I've added a column to Grady's Matrix, so that it show's both the "Initial Report Outline" and the "New Report Outline".

Attachments:

1. Outline of Frank Roskind's briefing
2. Grady Cothen's Report to the Congress Matrix of Responsibilities
3. Revised Outline for the Secretary's PTC Progress Report to the Congress

1. PTC Economic Team Status
    1. November 18, 1998
2. PTC Economic Team Status
    1. Accident Avoidance Benefits
3. PTC Economics Team Status
    1. Areas of Tentative Agreement
    2. Willingness to Pay to Avoid a Fatality:$2,700,000
    3. Willingness to Pay to Avoid an Employee Injury: $100,000
    4. Cost of HazMat Remediation: $250,000 per Hazmat Car Releasing
    5. Lading Loss and Damage: $6,500 per freight car derailed
    6. Freight Rerailing or Wrecking Cost: $2,500 plus $750/loco; $300/car
4. PTC Economics Team Status
    1. Tentative Consensus to Discontinue Consideration
    2. Environmental Costs not Remediated (Unless discussion with EPA provides more data
    3. Business Costs of Evacuations (Included in Evacuation Costs)
5. PTC Economics Team Status
    1. Passenger Issues
    2. Willingness to Pay to Avoid a Passenger Injury
        1. Reporting standards are different
        2. Injuries may be different
    3. Track and Equipment damage
        1. Equipment is unique
    4. Wreck Clearing and removal

5. Delay Costs

6. PTC Economics Team Status
    1. Track and Equipment Damage
    2. Economic Level of Repair vs. Book Value
    3. Earlier Reports suggested a multiplier of 1.5625 to 2.11
    4. Passenger Equipment is Unique and May Require a Different Multiplier
7. PTC Economics Team Status
    1. Evacuation Costs
    2. AAR Has a Relevant Study
        1. AAR's study includes business costs
    3. FRA Had Proposed $1,000 per Person Evacuated
    4. AAR May Have Data on Duration of Evacuations
8. PTC Economics Team Status
    1. Freight Train Delay Costs
    2. Tentative Agreement on $250 per Train-Hour
    3. FRA Had Proposed $300 per Train-Hour Times 2 Hours per Accident Times Number of Trains in 2 Hours (Trains per Day/12)
    4. Group is Discussing Weighting by Severity
    5. There may be New Evidence on Delay Costs
9. PTC Economics Team Status
    1. Damage to non-RR Wayside Persons and Property
    2. AAR Data Suggests This is a Small Number
    3. Group is Considering a Small Multiplier
    4. FRA Had Proposed 20% of Track Damage Cost Where 10 or More Cars Derailed
10. PTC Economics Team Status
    1. PTC System Costs
11. PTC Economics Team Status
    1. PTC System Costs
    2. Costs by Level, Type
    3. Four Levels
    4. Types of Costs
        1. Per Locomotive/Power Unit
        2. Per Mile (Route or Track?)
        3. Per Installation
            (1) Central and Software Development Costs
12. PTC Economics Team Status
    1. Costs Per Locomotive/Power Unit
    2. Tentative Agreement
        1. Level 1
            (1) $40,000 per Locomotive/ Power Unit
            (2) Group Considered Effectiveness (Must be the Same at All CRAM Levels
        2. Levels 2, 3, and 4
            (1) These Levels Don't Require Different On-Board Equipment
            (2) $75,000 per Locomotive/ Power Unit
13. PTC Economics Team Status
    1. Costs Per Mile

2. Per Route-Mile
    1. Communications Equipment
3. Per Track-Mile
    1. Wayside Interface Units
        (1) Discussion is Focusing on About $40,000 per WIU
        (2) WIU Cost may be Different for Various Types of WIU

14. PTC Economics Team Status
    1. Remaining to be Started

15. PTC Economics Team Status
    1. Remaining to be Started
2. Per Installation Costs
    1. Central and Software Development Costs
3. Other-than-Safety Benefits
4. Intermodal Considerations
5. Alternatives to PTC Technologies
6. Implications for Traffic, Information and Asset Management
7. Analysis, Conclusions and Reports

1. 16. PTC Economics Team Status
    1. Future Meetings
2. December 14 (and 15?), 1998, New Orleans
    1. Congressional Report Materials Due
3. January 14 and 15, 1999, Washington, DC (APTA)

Initial Report Outline
New Report
Outline

Topic

Source

Responsibility

Status

Comment

Executive Summary

New

FRA

!

Last step

I
I

Introduction

Prior draft / revisions

FRA—Cothen

Reviewing prior material for applicability

Draft prior to Dec. meeting

II
II

Recap 94 rept.

Prior draft /
revisions

FRA—Cothen / ARINC

Take material from ‘97 draft

III
III
PTC Architectures:

ARINC

In process

III - A
III - A

Train control systems and allied technologies

ARINC

In process

III - B
III - B

Current system concepts

Supplier survey

Stem, Lindsey, Bundy

R. Lindsey was following up, including narrative (Stotts please resolve with Ron)

III - B
III - B

Railroad project summary

Moody, Stotts

Stotts please get current draft from Howard and review

III - C

III - A

Safety-relevant differences among system concepts (integrate into III - A)

ART report,
Functions matrix

ART team; Stotts

Need narrative that describes functions w/ focus on active R.R. projects (Stotts please get current draft from Howard and review, integrate narrative based on matrix; needs introduction that compares and contrasts PTC with other methods of operation)

IV

Risk reduction potential

Need caution that attempts to achieve perfection will result in inaction

ARINC

IV - A

III - B

PTC functions / core (move to III - A)

RSAC

ARINC

IV - A 1.
III - A
2.

Hazard targets (detectors) (move to III.A)

ITS team

Moody/ARINC (target concept)
ITS team (substance)

IV - A 2.

III - A
1.

Illustrative levels of functionality (move to III - A)

ART team report

Moody

Needs clarification for lay person

IV - A
3.
III - C

PTC Interoperability and safety

McCord gather info.

Bill Goodman says they will have soon (as of 11/20)

Purpose is to explain importance to joint operations

IV - A 4.

IV - C

Risk reduction potential **analysis** (ASCAP approach) (Make last section of IV)

Dr. Giras material

Dr. Giras / ASCAP team

AAR/ARINC discuss with Ted how fits story line

IV - A 5.
IV - C

Importance to safety of rail passenger service

Similarity of freight and passenger safety objectives??

APTA / Hooper (see Gallamore material?)

NTSB recs. on Silver Spring

McCord assist

IV - A 6.
III - B

ITS/PTC interface (may move to Sec III)

ITS team

Draft in progress as of 11/17

IV - B
IV - A

Preventable collisions, derailments and casualties

ART report

Moody pls provide current draft;
McCord generate additional tables

IV - C
IV - B

Risk as a function of salient variables

CRAM II

Volpe

Partial draft provided 11/17

IV - D
IV - D

Potential role of systems with limited functionality and challenge of light density lines

ART team /Milhon/
Get NTSB involvement

V

V

Costs and benefits **(safety)** (business benefits to move to Sec VII)

Econ team

Working

FRA drafting business benefits material for group's review

VI - A
VI - A

Development and deployment of PTC systems ***(move to Sec III??)***

Gallamore

VI - B
III - B

Safety performance standards (move to Sec III)

Standards task force (Goodman)

VI - C
VI - B

Radionavigation tools [NDGPS]

FRA to provide (Shamberger)

In preparation; draft by 12/8

VI - D
VI - C

RF spectrum

NAARN material

Howard Moody/ R. McCown and ITS team

Draft to be simplified

VI - E
VI - D

Deployment issues

ARINC overview—levels of issues

VI- E
1
VI - D
1
Demonstrate commercial reliability and viability
CEO letter
FRA

ARINC overview
!

VI - E
2
VI - D
2

Resolve interoperability in service

Operating rules team/McCord

VI - E
3
VI - D
3

Resolve intraoperability issues (trains and on-track equipment)

Operating rules team/McCord

VI - E
4

VII - F

Achieve scale of implementation necessary to return benefits (move to Sec VII)

FRA (RDV)

VI - F
VI - E

Program elements (pilot program, testing, models, tools, etc.)

ARINC

VII - A
VII - A

Other communications, command and control requirements for the 21st Century

Efficiency-related attributes-
comm. infrastructure;
potential interface w/CAD & traffic planners
flexible blocks

Progress report team / R. Lindsey to provide core infrastructure platforms / gateways

FRA (RDV)

VII - B
VII - B

Implications for traffic, information and asset management

~~Econ team~~ FRA (RDV)

Econ team to review, comment if desired

VII - C
VII - C

Intermodal considerations and transportation externalities

FRA (RRP) / Palley

Draft circulated 11/18; Joel incorporating initial comments

VII - D
VII - D

Alternatives to PTC technologies

~~Econ Team~~
FRA (RDV)

VII - E
VII - E

Summary of other-than-safety benefits to the industry and society

~~Econ Team~~
FRA (RDV)

Appendices

Glossary

Implementation task force

CRAM II

Volpe

RR project matrix

Stotts

Presented 11/18; Stotts incorporating comments, corrections

Secretary's PTC Progress Report to the Congress
Outline for Discussion by the Implementation Task Force

NOTE: The immediate task before the Working Group is preparation of its own report to the Administrator. Preparation of the report in a format suitable for use as a progress report to the Congress will assist FRA is meeting its statutory responsibilities. The Administrator will review the report to ensure that it represents Administration policy. The Office of the Secretary of Transportation, with review by the Office of Management and Budget, will have final approval of this report. FRA seeks assistance from the PTC Working Group in developing this report *and will clearly distinguish in the final Report to Congress any material approved by the RSAC from any material not approved by the RSAC.*

Executive Summary in Front *(FRA will do, Grady Cothen - point of contact)*, then:

I. Introduction: The Concept of Positive Train Control (safety functions and other functions as conceived in industry efforts, such as ARES and ATCS) *(FRA will do, Grady Cothen - point of contact))*

Commentary: Needs to introduce basic rail transportation terminology, such as types of territory, density of operations, etc.

II. Recap: 1994 Report and Action Plan *(FRA will do, Grady Cothen - point of contact))*

III. PTC architectures *(RSAC Progress Report Group, [points of contact are Chuck Dettmann, Grady Cothen, and James Stem until team make-up has been determined])*

A. Train control systems and allied technologies [explain similarities and differences between train control systems and other technologies than address one or more PTC functions]

Commentary: Add introduction of how technology has enabled advancements in safety and efficiency of operations. Add some history; e.g., describe traditional signaling technology (Possibly extract portions of Bob Gallamore's article in Railway Age). Discuss proven safety record, fail safe concepts, closed loop, cab signals, and PTC concepts. (Need to be sure it doesn't duplicate information presented in Section I. Some of this material is in the 1994 report.

Should compare different systems based the system functional elements (location system, communications, operator display, how/where safety problem is identified, how system reacts to detected problem). Should discuss how different systems address different risk areas and achieve different levels of risk reduction.
Possible areas in which systems may differ: approach to monitoring and detection, processing, prevention, actions taken.

B. Current system concepts

Commentary: Should cover the following topics:

Primary characteristics of train control systems (open loop vs. closed loop, safety concepts, types of hazards being protected against

Core functions / possible auxiliary functions (more details on new peripheral devices such as wash-out monitors/alerters, etc.?) (Standards Task Force)

possible additional functions

Address the concept of hazard targets and discuss how the PTC architecture will accommodate integration of other hazard detectors to address territory-specific hazards (washout, bridge alignment, grade crossing detectors, etc.) as they are justified.

Illustrative levels of functionality (ART 4-Level construct)

Address interoperability and safety

Safety-relevant differences among system concepts (Stotts Matrix can be used as a working document)

Basic technology elements (GPS, datalink, advanced braking systems, etc.)

Current technology and systems

What is being tested

What is being installed

European communications based train control (functions, development status, issues, problems)

Cost tradeoffs of US vs European train control systems (e.g., differences in mix of freight vs passenger traffic, differences in train density, subsidization)

Transit industry communications based train control control (functions, development status, issues, problems)

Future directions in PTC technology

Technology and implementation challenges

The descriptions should include annotations of their primary characteristics (open-loop, closed-loop, safety concepts, etc.)

ITS/PTC interface and highway-rail crossing safety (and any other intelligent transportation systems?)(Narrative discussion that describes the ITS interface and how it could relate/interface with PTC architectures...build on Louisville Report??)((There is a report done in Canada that Bill Moore Ede of CANAC can/will provide)) (PTC ITS Team [Mark Jones - point of contact, Hollingsworth, Moody, Buxton, DePaepe, Horstman, Inclima, Hooper, Travis, Shiffen, Hofsinger, Roop, Hubbell , ATK representative?], FAA will include someone from Highway-Rail GX Division)

Note: This team will also deal with wayside detector issues, and will be the recipient of the RF Report.

1. U.S. railroad projects [compendium]
2. Supplier approaches [supplier survey]
3. Northeast Corridor systems

Commentary: Discuss control concepts:

Warnings (including proximity warning)

Open-loop control

Closed-loop with human in the loop control

Closed-loop with machine in the loop control

To include information from matrix from Dick Stotts.

C. Interoperability *(PTC IDOT Project will address this issue as an early priority and try to deliver a report that can be used)*. Differentiate between requirement to be interoperable and the definition of interoperability, and between system interoperability and operating interoperability. If a train is equipped with PTC but cannot meet these requirements or communicate with the

host road's system, it is not interoperable, and must operate as an unequipped train.

IV. Risk reduction potential *(RSAC Progress Report Group, [points of contact are Chuck Dettmann, Grady Cothen, and James Stem until team make-up has been determined])*

Commentary: The point should be made that trying to address all possible risk areas leads to an inability to ever settle on the system requirements. It's better to address the primary risks and achieve incremental safety improvements. The issue of incremental improvement of safety also includes the issue of equipping the territories and the locomotive fleet; therefore, the issue of handling unequipped trains is part of the implementation strategy.

A 100% risk reduction cannot be assigned to any individual risk countermeasure. Achieving safety is a combination of risk reduction strategies, targeted at specific safety concerns.

A. Preventable collisions, derailments, and casualties at different levels of functionality [Summary ART data] [& narrative report goes here] *(PTC - ART [Hollingsworth, Bush - point of contact, McCord, Stotts, Ralph, Moody, Milhon, Moller,, DePaepe, Newman, Inclima, Stem]*)

Risk as a function of salient variables [executive-level summary of CRAM II results and evaluation of significance] *(FRA and Volpe will do, delivery @ Nov. Meeting)*

Commentary: Discuss CRAM model approach and results. Address problems of prediction with infrequent events. Introducton of model should address the limits of its applicability and a discussion of what it does/does not address)

Approach to Safety Management

Safety performance standards *(Glean data from PTC Standards TF)*

Risk reduction potential (from Dr. Giras material)

Importance to safety of passenger rail service; similarity of freight and passenger safety objectives (core functions); reference to Silver Spring accident with MARC/Amtrak. As a practical matter operating rules and practices e.g. time separation, no following freight moves, delayed in block, have kept freight and passenger trians apart. (Fran Hooper)

Commentary: Address RAM-S (Reliability, Availability, Maintainability, and Safety) standards that are used to define performance requirements.

D. Potential roles for systems with limited functionality [e.g., proximity warning concepts] and the challenge of light density lines (Milhon)

Commentary: Address issue of forward compatibility as evaluation criteria for limited functionality systems; e.g., can system be upgraded to provide the core functions? Limited functionality systems may be used where full PTC is not justified, and they provide incremental safety improvement even if they do not meet all of the PTC core objectives.

V. Safety Costs and Benefits of PTC systems (*PTC Economic Team [Lynn Jarrett, Milhon, French, Roskind - point of contact, Ditmeyer, Newman, DePaepe, Clifford, Labor Economist TBD, 2 representatives from APTA TBD, FRA Accident Investigative Person, ATK representative?]])*

Commentary: The discussion of costs versus benefits should address the following points:

Neither costs nor benefits should be double counted

Systems built to achieve business benefits may offset some PTC costs (e.g., datalink), but the value of the benefits are not attributable to PTC.

VI. Development and deployment of PTC systems (*RSAC Progress Report Group, [points of contact are Chuck Dettmann, Grady Cothen, and James Stem until team make-up has been determined]*)

Introduction

Introduce idea of three levels of deployment issues

National = spectrum and dGPS

Industry = PTC program

Railroad = equipped/unequipped issue, interoperability

B. Radionavigation tools [DGPS] *(FRA (Shamberger) will provide report to the steering group)*

C. Radio frequency spectrum / management and utilization [refarming, APCO 25, etc.] *(Moody)*

D. Deployment Issues

1. Demonstrate commerical reliability and viability (i.e., does the system work in revenue service?) (ARINC)

2. Resolve interoperability in service, e.g. -Define and execute hybrid methods of operation: determine operating rules appropriate to handle unequipped trains & on-track equipment. Define strategies for handling unequipped trains and discuss how this impacts deployment. (Rules Team)

3. Resolve intraoperability issues, e.g. -Define and execute hybrid methods of operation: determine operating rules appropriate to handle unequipped trains & on-track equipment (Rules Team)

E. Program Elements (pilot program, testing, models, simulation tools, etc.) (ARINC)

VII. Other communications, command and control requirements for the 21st Century: potential role for PTC systems (RSAC Progress Report Group, Lindsey to provide white paper on core infrastructure platforms / gateways). This section to address all non-safety benefits.

A. Efficiency-related attributes of available architectures

Communications infrastructure

Potential interface with CAD / traffic planners

Flexible blocks

Commentary: Need to look at GE-Harris report that addresses these features.

B. Implications for traffic, information and asset management, system capacity, service quality and profitability [including discussion of the extent to which the National rail system is capacity constrained or is expected to become so within the next 2 decades]

C. Intermodal considerations and transportation externalities

Growth of time-sensitive traffic

Importance of privately owned freight railroads to efficient movement of goods

Conservation of energy and protection of the environment (FRA Office of Policy Studies, Summary of..)

Future of railroads as hosts to commuter and high-speed intercity passenger service

D. Alternatives to PTC technologies

E. Other-than-safety benefits to the industry and the remainder of our society from PTC systems: estimates [potential future benefits that will not be realized using alternative technologies]

ARES Harvard Business Case

PB (Parsons Brinckerhoff) short corridor study

Transportation externality studies for freight: how can they be applied?

Commercial Feasibility Study (high-speed rail)

F. Achieve scale of implementation necessary to return benefits

Appendices:

A. Glossary [start with terms from 1994 report, Sec. 17 AAR S&TC, other sources as appropriate]

B. Final Report: Corridor Risk Analysis Model [Include summary of views regarding usefulness of results.]

C. Railroad Project Matrix